



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/916,115	07/25/2001	Brian Wells	130109.406	7456

500 7590 02/10/2004

SEED INTELLECTUAL PROPERTY LAW GROUP PLLC
701 FIFTH AVE
SUITE 6300
SEATTLE, WA 98104-7092

EXAMINER

CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
----------	--------------

1746

DATE MAILED: 02/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

ed01

Office Action Summary

Application N .

09/916,115

Applicant(s)

WELLS, BRIAN

Examiner

Jonathan S. Crepeau

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-23,32 and 33 is/are allowed.
- 6) ☒ Claim(s) 1,3,5,6,24 and 26-30 is/are rejected.
- 7) ☒ Claim(s) 2,4,25 and 31 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4.6.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Suggestions

1. Claim 4 recites the limitations “the optoisolator,” “the negative reference voltage supply,” and “the positive reference voltage supply.” These limitations do not appear to have proper antecedent basis in claim 1. Additionally, in claim 28, “second resistance” in the last line should be “second resistor.” Appropriate correction is suggested, but not required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3, 5, 24, 26, 27, and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Summers et al (U.S. Patent 3,808,534), as evidenced by the article entitled “semiconductor device” (Encyclopedia Britannica). Regarding claims 1 and 5, Summers et al. is directed to a fuel cell system comprising a plurality of fuel cell stacks (70, 72, 74) connected in series (see Fig. 2). Transistors (96, 114) are coupled to respond to a voltage across one of the stacks (see Fig. 2). Regarding claim 1, although not expressly disclosed by Summers et al., transistors 96 and 114 are pnp bipolar transistors, as evidenced by Figure 4C of the Encyclopedia Britannica article. Alarm circuits (nnp transistors 106, 120 and lamps 94, 112) are coupled to the collectors

of pnp transistors 96, 114 (see col. 4, line 67; col. 5, line 38). Regarding claim 3, first and second base resistors (104, 110) are located between the base of transistor 96 and fuel cell stack 70. Regarding claim 24, a first terminal (base) and a switching terminal (emitter) of transistor 96 are coupled across the fuel cell stack (see Fig. 2). Regarding claims 24 and 29, first and second indications are produced (i.e., lamp 94 is off or on) when voltage across stack 70 is higher or lower, respectively, than a predetermined level (i.e., one-half volt less than the voltage across stack 72) (see col. 5, line 21). Regarding claim 26, the emitter (switching terminal) of transistor 96 is connected to the anode (negative) side of stack 70 and the base of transistor 96 is connected to the positive (cathode) side of stack 70 (see Figs. 1 and 2). Regarding claim 27, the emitter (switching terminal) of transistor 96 is connected to the anode of stack 70 through a first resistor (100) and is connected to the cathode of stack 72 through a second resistor (98) (see Fig. 2).

Thus, the instant claims are anticipated.

4. Claim 30 is rejected under 35 U.S.C. 102(b) as being anticipated by EP 982788. The reference is directed to a method of monitoring fuel cells in a fuel cell stack (see abstract). The method comprises the steps of monitoring a voltage across a first set of two fuel cells (a, b) with a first transistor (24) and a second voltage across a second set of fuel cells (c, d) with a second transistor (24) (see the Figure; paragraph 10). A first indication (i.e., a constant current flow across the string of transistors) is produced when the first and second voltages are each greater than a threshold voltage (i.e., the activation voltage of photoemitters 22) (see abstract). A second

Art Unit: 1746

indication (i.e., cessation of current flow) is produced when either of the voltages is less than the threshold voltage (see abstract).

Thus, the instant claim is anticipated.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Summers et al.

The reference is applied to claims 1, 3, 5, 24, 26, 27, and 29 for the reasons stated above.

However, the reference does not expressly teach the step of selecting the resistance of the first and second resistors (100, 98) to set the threshold voltage to a voltage in the range of 0.8-0.85 V, as recited in claim 28.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the reference provides sufficient guidance for the artisan to manipulate the resistance of the first and second resistors and the voltages of the fuel cell stacks so as to obtain a threshold voltage within the claimed range. First, it is known that the number of fuel cells in an individual stack may be varied according to the needs of the artisan. Summers recognizes this in column 4, line 54 ("For purposes of illustration, it will be

assumed that each of the stacks 70, 72, 74 contains 11 fuel cells which produce one volt each”). Thus, the artisan may reduce the number of cells, and thus the total output voltage, of each stack. Additionally, the reference teaches in column 5, line 5 that “[r]esistor 100 is adjustable so that the emitter voltage of the transistor 96 may be varied.” Hence, the reference provides sufficient guidance to adjust the voltage of the resistors as needed, based on the stack voltages and transistor activation voltages. Accordingly, Applicant’s claimed step of selecting the resistances to result in a threshold voltage of 0.8 to 0.85V would be rendered obvious to a skilled artisan.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Summers et al. in view of Vitale et al (U.S. Patent 6,066,408).

Summers et al. is applied to claims 1, 3, 5, 24, 26, 27, and 29 for the reasons stated above. However, the reference does not expressly teach that the fuel cell stacks are comprised of solid polymer fuel cells, as recited in claim 6.

Vitale is directed to a cooler-humidifier plate for a PEM (i.e., solid polymer) fuel cell (see abstract).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use PEM fuel cells as the fuel cells of Summers et al. In column 1, line 17, Vitale et al. teach the following:

electrical energy. PEM fuel cells offer many advantages over conventional means of generating electrical energy: they operate at relatively low temperatures and therefore require little or no warmup time; they are clean (their exhaust is typically water and air), they are quiet, they are efficient, and the typical source of fuel—hydrogen—is in abundant supply. Nevertheless, due to difficulties and costs in

Thus, the artisan would be motivated to use PEM fuel cells in the fuel cell stacks of Summers et al. in hopes of obtaining the advantages described by Vitale et al.

Allowable Subject Matter

8. Claims 7-23, 32, and 33 are allowed.
9. Claims 2, 4, 25 and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

Independent claims 7 and 12, and dependent claims 2, 4, and 25 each recite, among other features, an optoisolator having a switching terminal connected to the second terminal (collector) of a transistor. As noted above, Summers et al. teaches transistors for monitoring fuel cell voltages, but does not teach or fairly suggest optoisolators connected to the collectors of the transistors. EP '788 teaches optoisolators (14) for monitoring fuel cell voltages, each comprising a photoemitter (22) and a phototransistor (24). However, the reference does not fairly suggest a separate transistor which is connected to the optoisolator (phototransistors 24 are considered to be part of the optoisolators and do not correspond to the claimed transistors). Thus, claims 7-15 are allowed, and claims 2, 4, and 25 contain allowable subject matter.

Independent claim 32 recites, among other steps, the step of monitoring a voltage across a first set of at least two fuel cells with at least a first transistor and a first optoisolator. EP '788 and Summers et al., the closest prior art, both fail to teach or fairly suggest such a simultaneous monitoring with an optoisolator and a transistor.

Independent claim 16 recites, among other features, a set of digitizing switches and a set of triggering switches which are couplable across fuel cell structures. As set forth above, Summers et al. and EP '788 do not teach or fairly suggest the claimed combination of digitizing switches (e.g., optoisolators) and triggering switches (e.g., transistors).

Dependent claim 31 recites, among other features, that the first transistor has a first terminal and a switching terminal coupled to the first set of at least two fuel cells. Transistor 24 of EP '788, which is considered to correspond to the claimed transistor, is not directly coupled to any of the sets of fuel cells. Accordingly, claim 31 contains allowable subject matter.

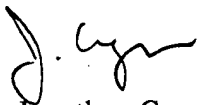
Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (571) 272-1302. The phone number for the

Art Unit: 1746

organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.



Jonathan Crepeau

Patent Examiner

Art Unit 1746

February 6, 2004